


United States Nuclear Regulatory Commission Official Hearing Exhibit	
In the Matter of:	SHAW AREVA MOX SERVICES (Mixed Oxide Fuel Fabrication Facility)
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May 3, 2013

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:  
Michael C. Farrar, Chairman  
Paul B. Abramson  
Dr. Nicholas G. Trikouros**

In the Matter of:  
  
SHAW AREVA MOX SERVICES, LLC  
  
(Mixed Oxide Fuel Fabrication Facility  
Possession and Use License)

May 3, 2013

Docket No. 70-3098-MLA

ASLBP No. 07-856-02-MLA-BD01

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**SHAW AREVA MOX SERVICES, LLC'S  
PRE-FILED REPLY TESTIMONY  
IN RESPONSE TO BOARD'S JUNE 29, 2012 MEMORANDUM AND ORDER**

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**I. Introduction**

Q1: Please state your names.

A: My name is Gary Bell (GB).

My name is Gary Clark (GC).

My name is Martha Williams (MW).

Q2: What is your educational background and experience?

A: **[All]** We previously presented our backgrounds and experience in response to Question 2 of our revised initial pre-filed testimony in the proceeding, which has been admitted as Exhibit APPR00014, and in our curriculum vitae, admitted as Exhibits APP000016-18.

Q3: What is the purpose of your testimony?

A: **[All]** The purpose of our testimony is to respond briefly to certain matters raised by Intervenors in their legal Response to our previous testimony, which we offered as Exhibit APPR00037 and which addressed questions identified in the Board's June 29, 2012 "MEMORANDUM AND ORDER (Requesting Further Information from the Applicant)."

Those questions related to Contentions 9 and 11.

Q4: Please elaborate on the use and appropriateness of the 3% defect rate used for MMIS and PLC data verification.

A: **[GC, MW]** MOX Services researched defect rates as a statistical parameter and selected the value of 3% based on valid, generally accepted statistical principles, as we noted multiple times in our previous testimony. MOX Services specified a defect rate value so that it could calculate a power of detection, in order to quantify the confidence level of the proposed data verification process.

Selecting a defect rate value is a statistical choice. The defect rate is just one of the factors that had to be considered when designing the statistical test. A 3% defect rate was chosen because it was recommended in the research literature. As we repeatedly noted in our previous testimony, the 3% rate does not represent an acceptable level of data inaccuracies, as the Intervenor suggests. Rather, MOX Services uses this quantity to calculate the number of item movements required to achieve a specific level of confidence, comparable to a 99% power of detecting errors. In actual point of fact, any single data defect (*i.e.*, one item not stored where it is supposed to be) in any circumstance – whether routine operation, data verification activity, physical inventory, etc. – would cause an operational anomaly that would cause operations to be stopped and would require investigation and correction before operations could resume. Our practical expectation is that the number of data errors is exactly zero.

It is important to note that regardless of the defect percentage chosen, it is not possible for a statistical test to prove that the data are error free, even when they are. It is logically impossible to prove a negative, *i.e.*, that there are no errors. No amount of statistical sampling of a data set can prove with 100% confidence that there are zero errors.

In short, the parameters selected to determine the number of data verifications to provide further confidence in the MMIS and PLC data are well grounded in accepted statistical principles and practice, and are completely appropriate for this application.

Q5: Mr. Bell, do you have any further response to Intervenor's allegations regarding the potential for "tampering" with the software used to check the MMIS and PLC software?

A: **[GB]** Yes. I disagree with the characterization that the MOX Facility process control system software is "vulnerable." In our previous testimony, offered as Exhibit APPR0037, the answer to Question 42 details the cyber security controls that will be applied to the MOX Facility

process control system software. Application of these controls significantly reduces the risk of software compromise to a level such that the term “vulnerable” is a gross mischaracterization. One of the security controls, automated, periodic configuration audits of the installed software, is performed using configuration management software. These audits will detect any unauthorized change to the process control software. Access controls will be such that no single person will have authority over or access to more than one of the different types of software, that is, to the MMIS, PLC, or configuration management software. The configuration management software will also be subject to the other cyber security provisions I discussed in prior testimony. These protections make it highly unlikely that an adversary could maliciously compromise *all three* software domains without detection. The fact that separate configuration management software, controlled under a security program, will be used to audit the installed process control software is a strength, not a vulnerability.

Q6: Mr. Bell, do you have anything else to add regarding the Intervenors’ allegation that the MMIS and PLCs only “approximate” the location of items?

A: **[GB]** Yes. The Intervenors’ statement that the MOX Facility process control system “approximates the location of items to an unknown degree” is entirely wrong and was contradicted by my prior testimony. Movement and final positions of items in the MOX Facility are precisely controlled to +/- 0.25 inch, or better. Precise control is a necessity because of the relative size of the items compared to their respective storage locations and the close grouping of the storage locations. This level of precision prevents collisions and subsequent damage to the items and the manufacturing equipment that could result from mechanized movements.

Q7: Does this conclude your reply testimony?

A: **[GB, GC, MW]** Yes.

I declare under penalty of perjury that the foregoing is true and correct, to the best of my knowledge and belief. Executed on April 30, 2013.

  
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I declare under penalty of perjury that the foregoing is true and correct, to the best of my knowledge and belief. Executed on April 30, 2013.



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I declare under penalty of perjury that the foregoing is true and correct, to the best of my knowledge and belief. Executed on April 30, 2013.



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